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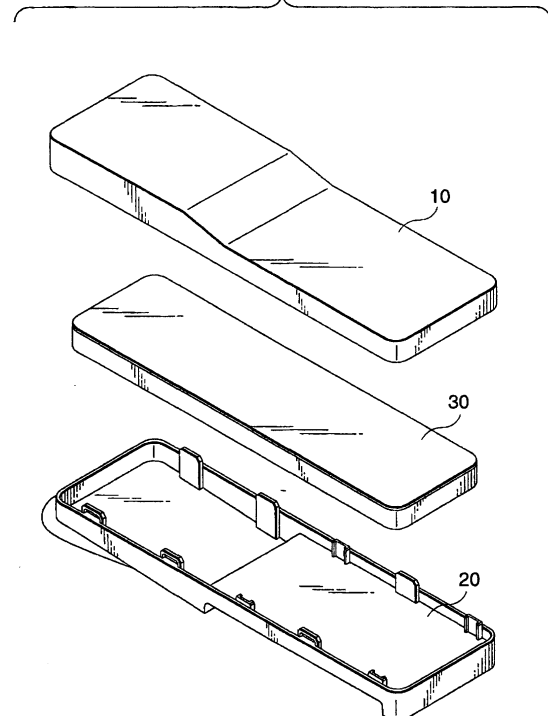
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(54) **Radio device housing**

(57) The invention is for providing a radio device housing, without the risk of causing deterioration of the mechanical strength and the rigidity of the housing with respect to bend or twist deriving from a small size and a thin shape of the radio device main body. First ribs are provided in either an upper case or a lower case on the entire periphery along the joint surface of the upper case and the lower case. A plurality of fitting nails are provided in either the upper case or the lower case for holding and fixing with each other. Second ribs are provided in the rifts in the case not having the first ribs. Third ribs are provided on the fitting nails and the second ribs for contacting the upper case and the lower case when they are fitted with each other so that they are not displaced in the thrust direction with each other.

FIG.1



Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a housing for a radio device, in particular, for a portable phone and a PHS. More specifically, it relates to that without the risk of deteriorating the mechanical strength and the rigidity of the housing with respect to bending or twisting in light of the trend toward realizing a smaller size and thinner shape in a radio device main body.

[0002] Recently, manufacturers of radio devices, in particular, portable phones and PHS are actively striving for the new product development for achieving a smaller size, a light weight and a thinner shape of the radio device main body. According to the trend, the mechanical strength of the housing for accommodating the radio device main body tends to be vulnerable due to a thinner shape of the housing and deterioration of the rigidity of the housing.

[0003] The configuration of a conventional radio device housing, such as a portable phone and a PHS will be explained hereinafter. FIGS. 11 to 16 show the structure of a conventional radio device housing. FIG. 11 is a perspective view, FIG. 12 is a right side view, FIG. 13 is a plan view of an upper case 10, FIG. 14 is a diagram showing the projection size B1 of a first rib in a housing, FIG. 15 is a plan view of a lower case 20, and FIG. 16 is a diagram showing the projection size of a fitting part 23 in the housing, respectively.

[0004] In FIG. 11, the radio device housing mainly comprises the upper case 10 and the lower case 20. The upper case 10 is provided with first ribs 11 on the entire periphery along the joint surface with respect to the lower case 20, and fitting nails 13 to be fitted with fitting parts 23 of the lower case 20.

[0005] On the other hand, the lower case 20 is provided with second ribs 21 in the rifts of the first ribs 11. Furthermore, fitting parts 23 to be fitted with the fitting nails 13 of the upper case 10.

[0006] Operation of the radio device housing with the configuration as mentioned above will be explained. After placing a functional block or a mechanism part of the radio device main body on the upper case 10 and the lower case 20, the upper case 10 and the lower case 20 are fitted with each other.

[0007] Of course, the fitting operation is executed with positioning at positioning points provided in each part. As a result of fitting the upper and lower cases, the upper case 10 and the lower case 20 will serve as a housing, with the radio device main body accommodated therein.

[0008] Various kinds of forces will be applied from the outside while using radio devices. Therefore, insufficient mechanical strength of a radio device housing would result in damage or breakage.

[0009] Although the conventional radio device housing is durable in a mode without bend or twist in terms of the mechanical strength owing to the function of the

first and second ribs, a problem is involved in that the mechanical strength is insufficient and damage or breakage is liable to be generated in a mode with bend or twist.

SUMMARY OF THE INVENTION

[0010] The invention is for solving the conventional problem, and an object thereof is to provide a radio device housing with a small size and the excellent characteristic, capable of solving the problem of deterioration of the mechanical strength and the rigidity of the housing accommodating a main body with respect to bend or twist deriving from a small size and a thin shape of the radio device main body.

[0011] In order to solve the problem, a radio device housing according to the invention comprises first ribs provided in either the upper case or the lower case, on the entire periphery along the joint surface of the upper case and the lower case, a plurality of fitting nails provided in either the upper case or the lower case, a plurality of fitting parts provided in the case not having the first ribs, second ribs provided among the plurality of the fitting parts provided in the case not having the first ribs, and third ribs provided on the fitting nails and the second ribs, in an upper case and a lower case of a radio device main body.

[0012] According to the configuration, a radio device housing with a small size and the excellent characteristic, capable of solving the problem of deterioration of the mechanical strength and the rigidity of a housing accommodating a main body with respect to bend or twist deriving from a small size and a thin shape of the radio device main body can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is an exploded perspective view showing the configuration of a radio device according to an embodiment of the invention.

[0014] FIG. 2 is a diagram showing the configuration of a radio device housing according to the embodiment of the invention.

[0015] FIG. 3 is a right side view of the radio device housing with an upper case and a lower case fitted with each other according to the embodiment of the invention.

[0016] FIG. 4 is a right side view showing the configuration of the upper case and the lower case according to the embodiment of the invention.

[0017] FIG. 5 is a partial enlarged view showing the positional relationship of a third rib at the coupling part of a fitting nail and a fitting part in FIG. 3.

[0018] FIG. 6 is a partial enlarged view showing the positional relationship between a second rib and a third rib in FIG. 3.

[0019] FIG. 7 is a partial plan view of the upper case of FIG. 2.

[0020] FIG. 8 is an enlarged view of a third rib of FIG. 7.

[0021] FIG. 9 is a partial plan view of the lower case 20 of FIG. 2.

[0022] FIG. 10 is an enlarged view of a fitting part in FIG. 9.

[0023] FIG. 11 is a perspective view showing the configuration of a conventional radio device housing.

[0024] FIG. 12 is a right side view showing the configuration of the conventional radio device housing.

[0025] FIG. 13 is a plan view of an upper case according to the configuration of the conventional radio device housing.

[0026] FIG. 14 is a diagram showing the projection size B1 of a first rib in the conventional upper case.

[0027] FIG. 15 is a plan view of a lower case according to the configuration of the conventional radio device housing.

[0028] FIG. 16 is a diagram showing the projection size of a fitting part in the conventional lower case.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0029] Hereinafter, an embodiment of the invention will be explained with reference to the accompanied drawings.

[0030] FIGS. 1 to 10 are diagrams showing the configuration of a radio device and a radio device housing according to an embodiment of the invention. In FIG. 1, the radio device comprises mainly an upper case 10, a lower case 20 and an internal unit 30. Functional blocks and mechanism parts of the radio device main body are not illustrated in order to avoid complication of the drawings. The same is applied to the subsequent drawings.

[0031] In FIG. 2, the upper case 10 is provided with first ribs 11 on the entire periphery along the joint surface with respect to the lower case 20, fitting nails 13 to be fitted with fitting parts 23 of the lower case 20, and third ribs 12 provided on both sides of the fitting nails 13, accurately measured from the center of the fitting nails 13.

[0032] On the other hand, the lower case 20 is provided with second ribs 21 in the rifts of the first ribs 11, the fitting parts 23 to be fitted with the fitting nails 13 of the upper case 10, and third ribs 22 provided on both sides of the second ribs 21.

[0033] Although the ribs, the fitting nails and the fitting parts are provided in either of the cases in the above-mentioned configuration, it is merely an example so that they can be provided the opposite side, or partially in the opposite side, and thus it is not limited thereto. Moreover, the third ribs 12, 22 are provided upright in the depth direction of the upper case and the lower case such that the upper case and the lower case can be contacted at least in two points in the entire periphery direction thereof when the upper case and the lower case are fitted with each other.

[0034] FIG. 3 is a right side view of the radio device

housing when the upper case 10 and the lower case 20 of FIG. 2 are fitted with each other.

[0035] The positional relationship among the third ribs 12, 22, the second ribs 21 and the fitting parts 23 can be understood clearly by referring to FIG. 3.

[0036] FIG. 4 is a right side view showing the configuration of the upper case 10 and the lower case 20. It is observed that unlike the conventional example, the third ribs 12, 22 are provided.

[0037] FIG. 5 is a partial enlarged view showing the positional relationship of a third rib at the coupling part of a fitting nail and a fitting part in FIG. 3. The positional relationship between the third rib 12 and the fitting part 23 mentioned above can be understood in further detail by the enlarged view of FIG. 5.

[0038] Moreover, FIG. 6 is a partial enlarged view showing the positional relationship between a second rib and a third rib in FIG. 3. The positional relationship among the third rib 12, the second rib 21 and the third rib 22 mentioned above can be understood in further detail by the enlarged view of FIG. 6. Furthermore, it is observed that inclined surfaces are provided in the vicinity of a tip part of the third rib 22.

[0039] FIG. 7 is a partial plan view of the upper case 10 of FIG. 2. It is observed in FIG. 7 that the third ribs, the fitting nails and the first ribs are provided in the periphery of the upper case 10. As is apparent from FIG. 7, the first ribs are provided in the entire periphery with rifts from place to place so that the fitting nails and the third ribs are provided in the rifts.

[0040] FIG. 8 is an enlarged view of a third rib of FIG. 7. As is seen in the enlarged view of FIG. 8, the third ribs have different projections sizes A1, A2, depending on the point to be mounted. Moreover, it is observed in FIG. 8 that the projection size of the third ribs A1, A2 is set to be larger than that of the first rib B1.

[0041] FIG. 9 is a partial plan view of the lower case 20 of FIG. 2. FIG. 10 is an enlarged view of a fitting part in FIG. 9.

[0042] Operation of the radio device housing with the configuration as mentioned above will be explained. After placing a functional block or a mechanism part of the radio device main body on the upper case 10 and the lower case 20, the upper case 10 and the lower case 20 are fitted with each other.

[0043] Of course, the fitting operation is executed with positioning at positioning points provided in each part. As a result of fitting the upper and lower cases, the upper case 10 and the lower case 20 will serve as a housing, with the radio device main body accommodated therein.

[0044] Then, the first and second ribs function for making up for the mechanical strength in a mode without bend or twist according to the function the same as the above-mentioned conventional configuration. Moreover, according to the function of the third ribs 12, 22, the upper case 10 and the lower case 20 cannot be displaced with each other in the thrust direction when the upper case and the lower case are fitted. As a result, the effect

of sufficiently making up for deterioration of the mechanical strength and the rigidity of the main body with respect to bend or twist deriving from a small size of the radio device main body can be achieved.

[0045] As described, since the third ribs are provided on the radio device housing except for the first and the second ribs, the upper case and the lower case are not displaced with each other in the thrust direction when the upper case and the lower case are fitted. As a result, the effect of sufficiently making up for deterioration of the mechanical strength and the rigidity of the main body with respect to bend or twist deriving from a small size of the radio device main body can be achieved.

[FIG. 1]

10 upper case
20 lower case
30 internal unit

[FIG. 2]

11 first rib
12 third rib
13 fitting nail
21 second rib
22 third rib

[FIG. 12]

23 fitting part

3. The radio device housing according to claim 1, wherein
an inclined surface is provided to a part of said third ribs.

4. The radio device housing according to claim 1, wherein
said fitting parts are provided with ribs on both sides of an engaging part with said fitting nails.

5. The radio device housing according to claim 1, wherein

said first ribs, said fitting nails, and said third ribs provided on said fitting nails are disposed in said upper case, and
said fitting parts, said second ribs, and said third ribs provided on said second ribs are disposed in said lower case.

6. A portable radio device accommodated in said radio device housing according to claim 1.

Claims

1. A radio device housing comprising:

first ribs provided in either an upper case or a lower case of said housing, on the entire periphery along the joint surface of said upper case and said lower case,
a plurality of fitting nails provided in either said upper case or said lower case,
a plurality of fitting parts provided in the case not having said first ribs,
second ribs provided among the plurality of said fitting parts provided in said case not having said first ribs, and
third ribs provided on said fitting nails and said second ribs, in an upper case and a lower case of a radio device main body.

2. The radio device housing according to claim 1, wherein

said third ribs are provided with a relationship in terms of the size such that said third ribs are contact with each other at two or more points between said upper case side and said lower case side.

FIG.1

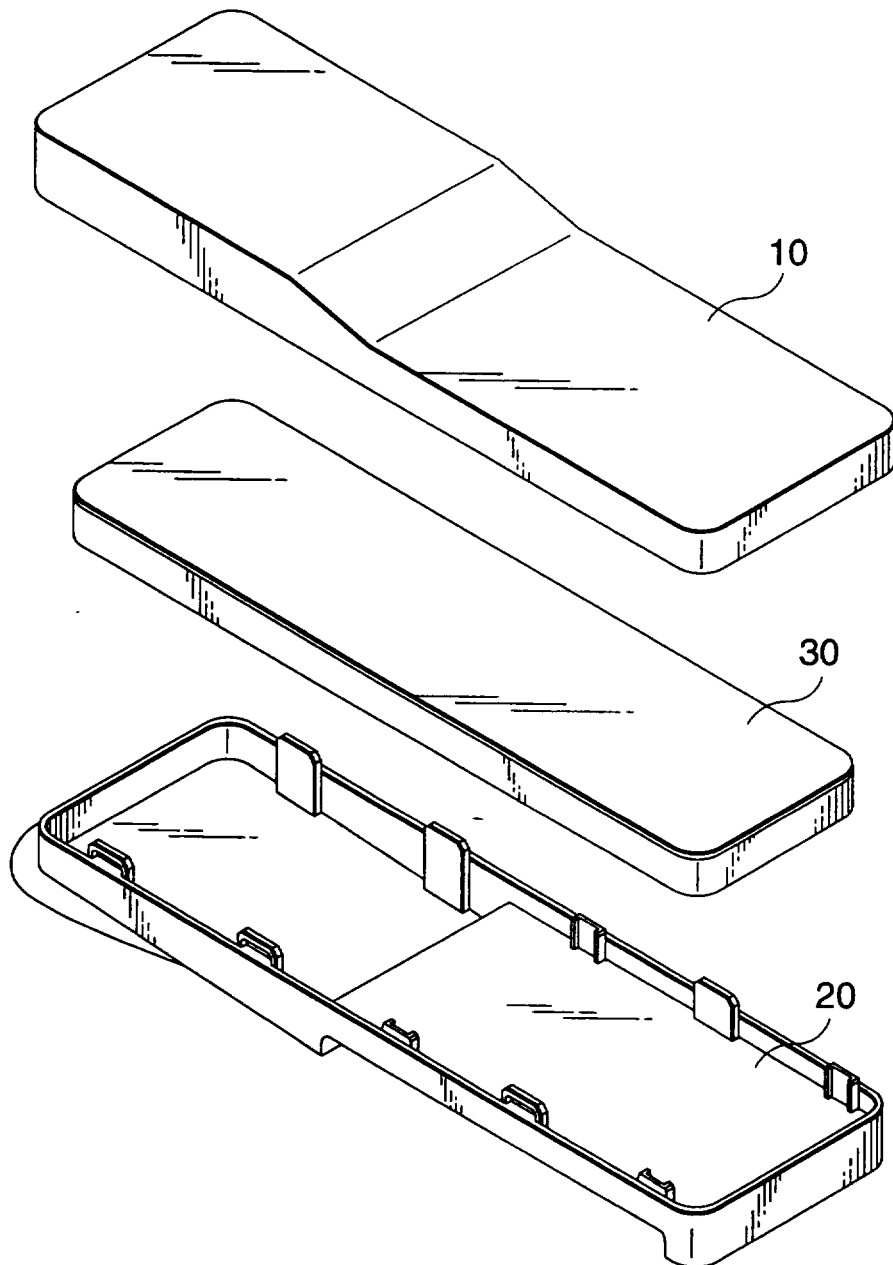


FIG.2

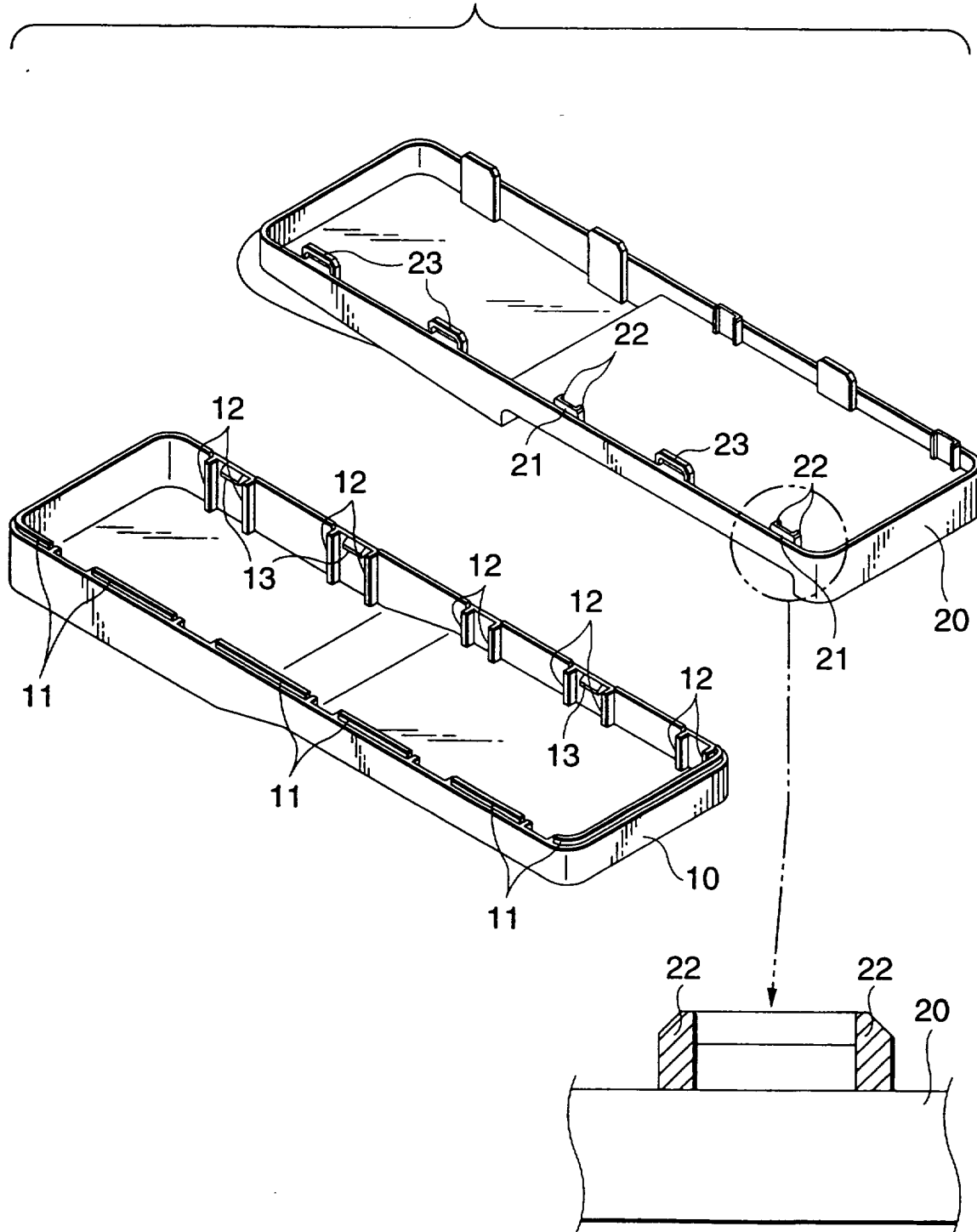


FIG.3

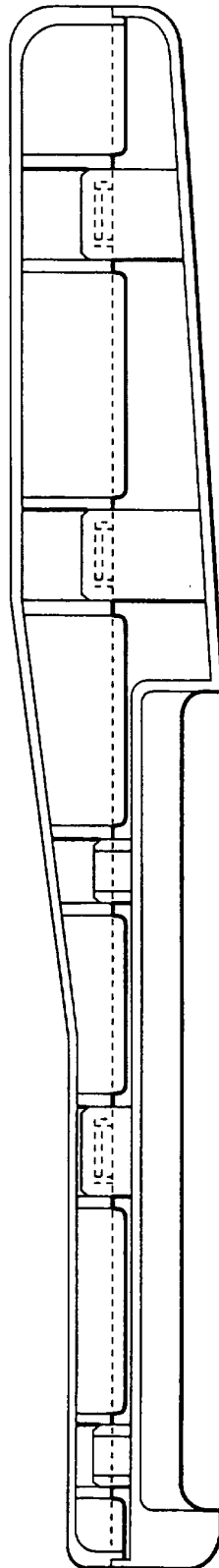


FIG.4

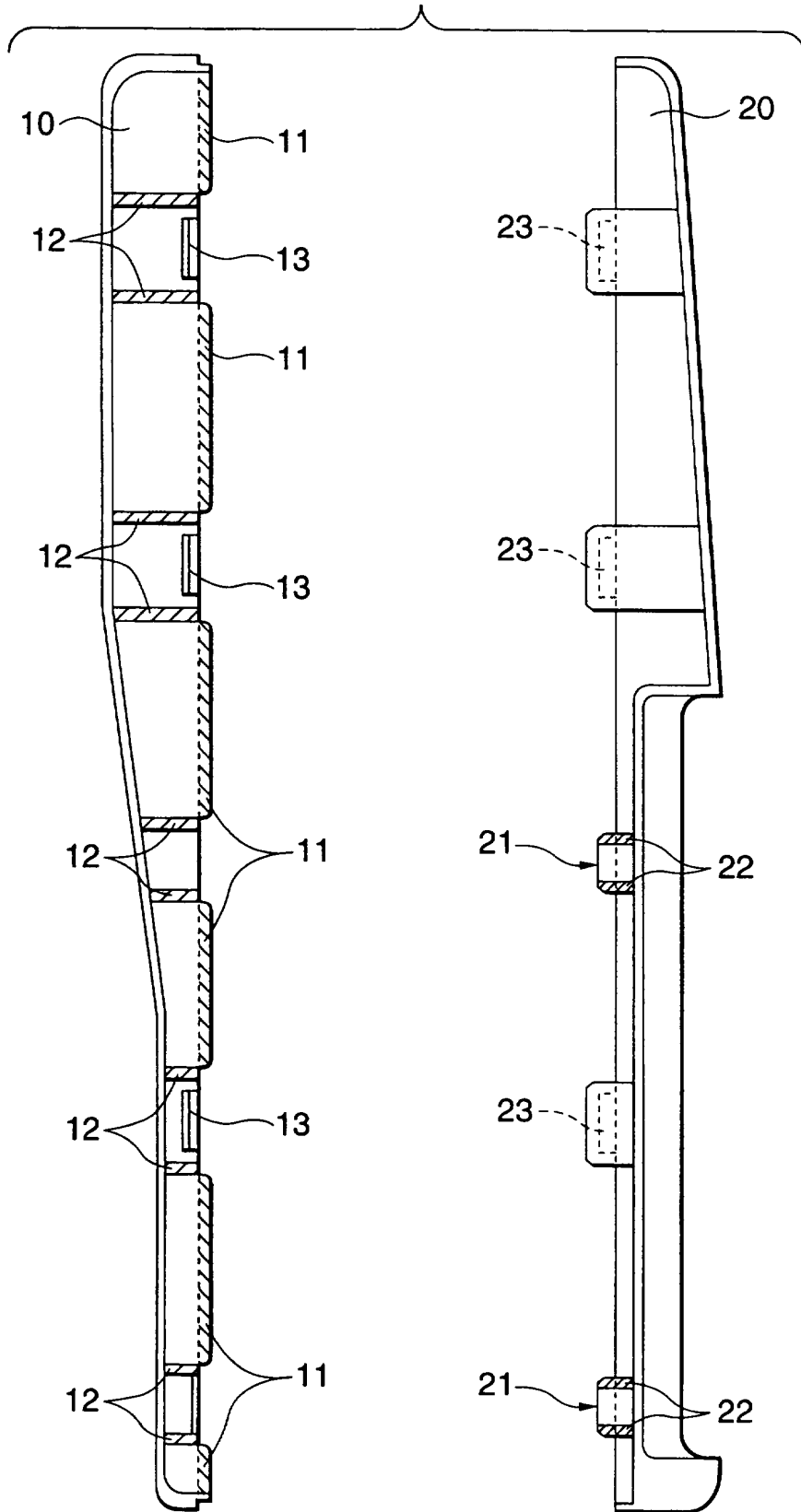


FIG.5

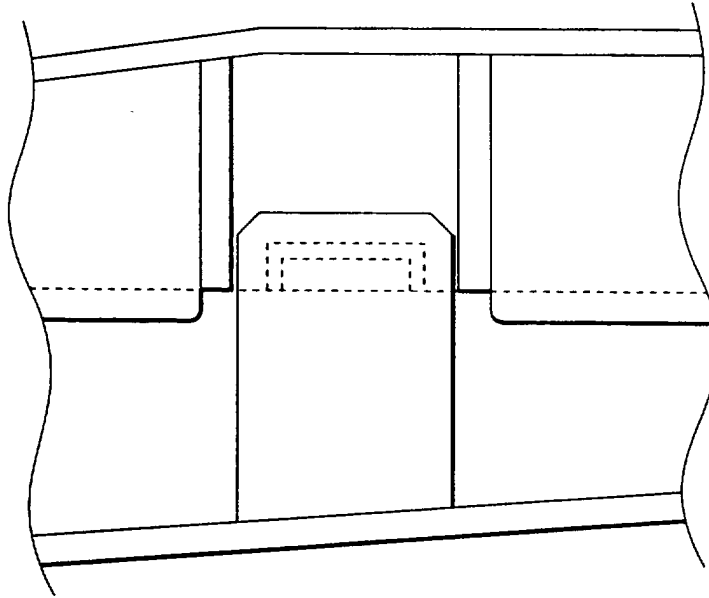


FIG.6

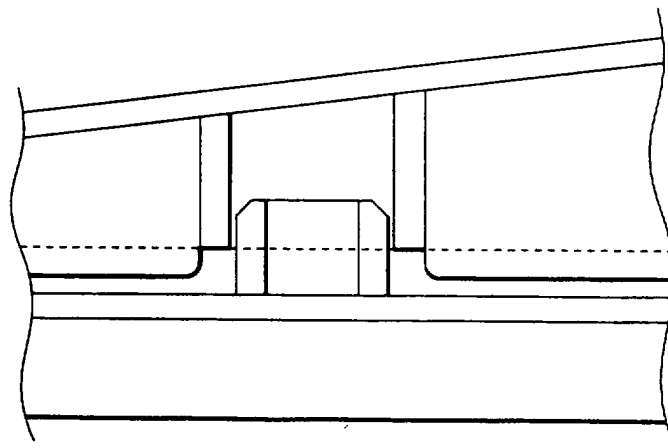


FIG.7

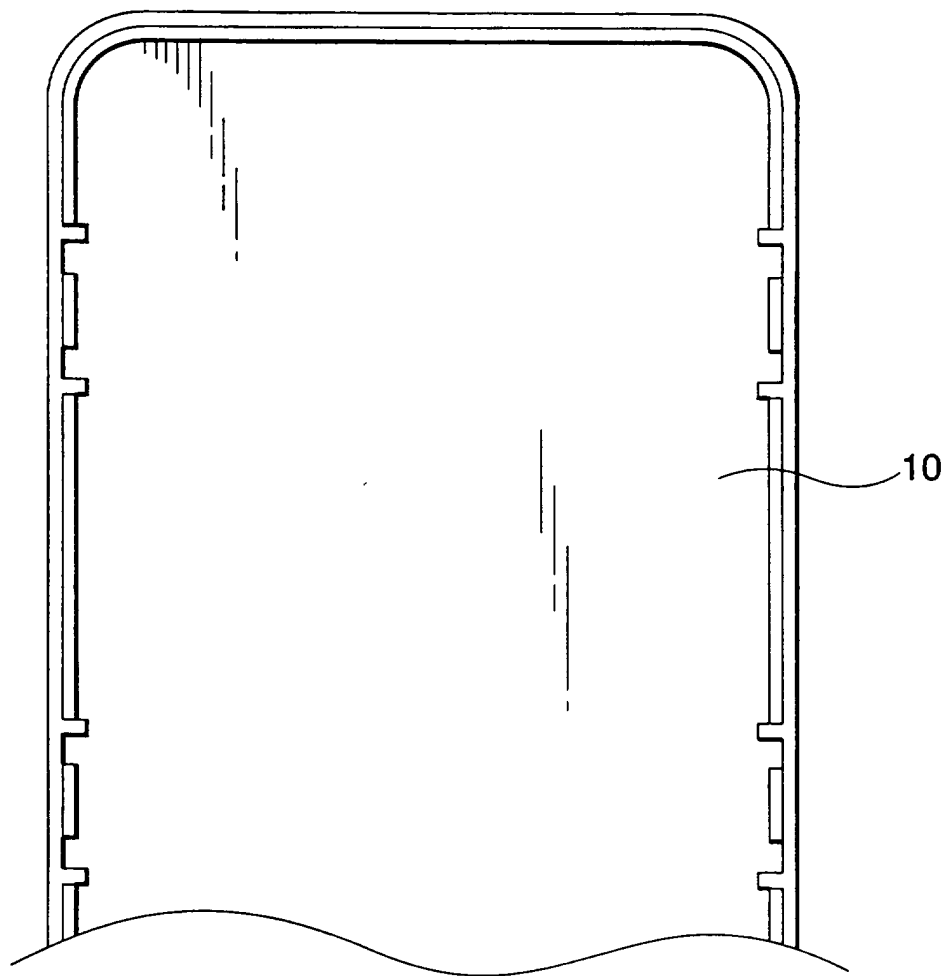


FIG.8

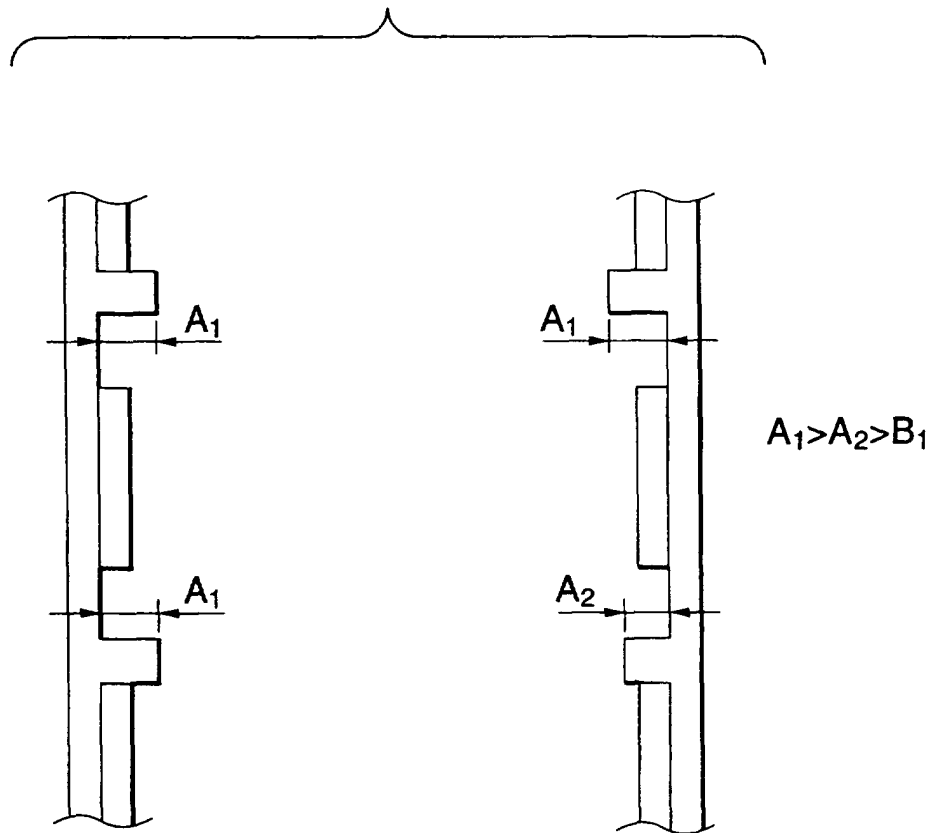


FIG.9

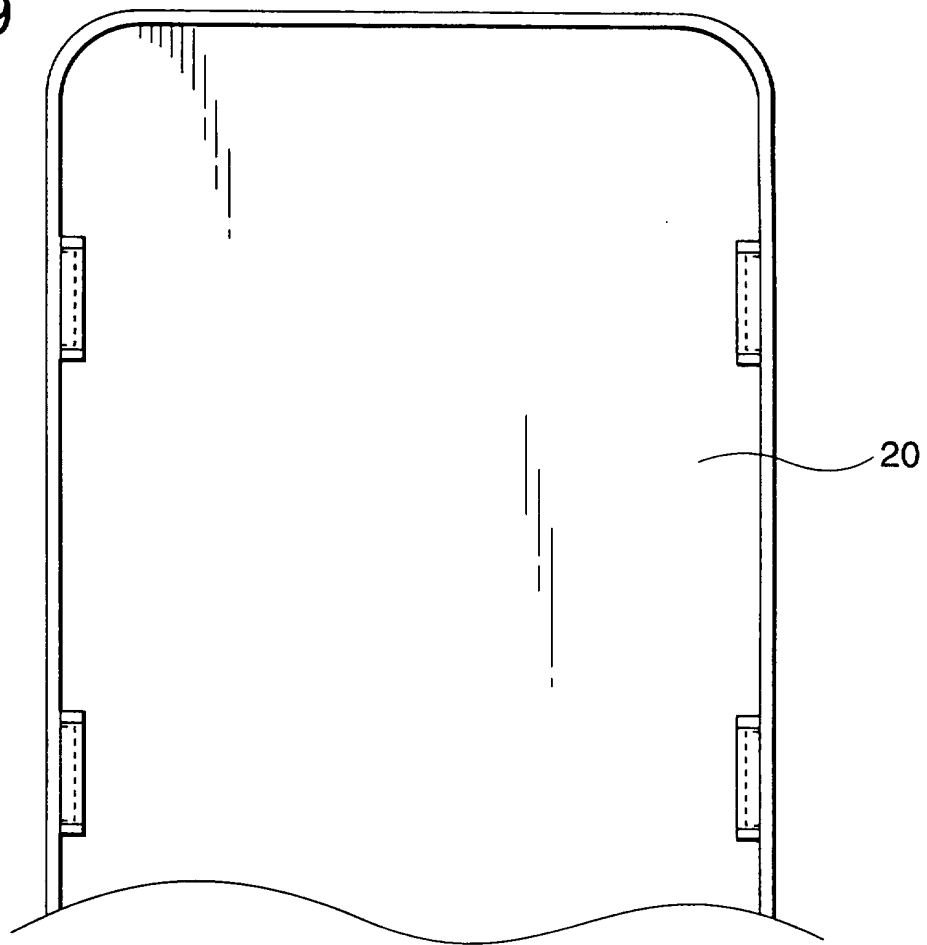


FIG.10

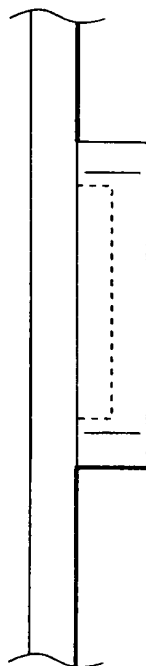


FIG.11

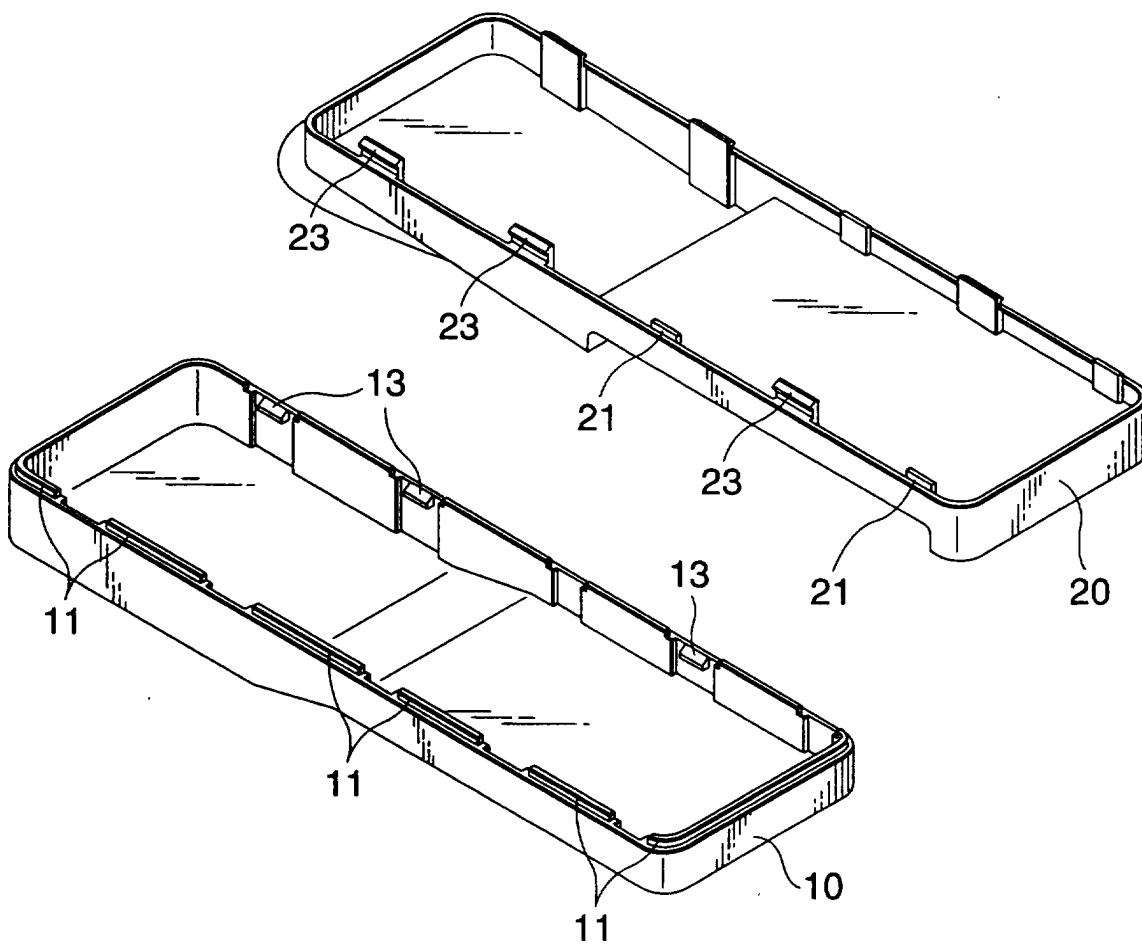


FIG.12

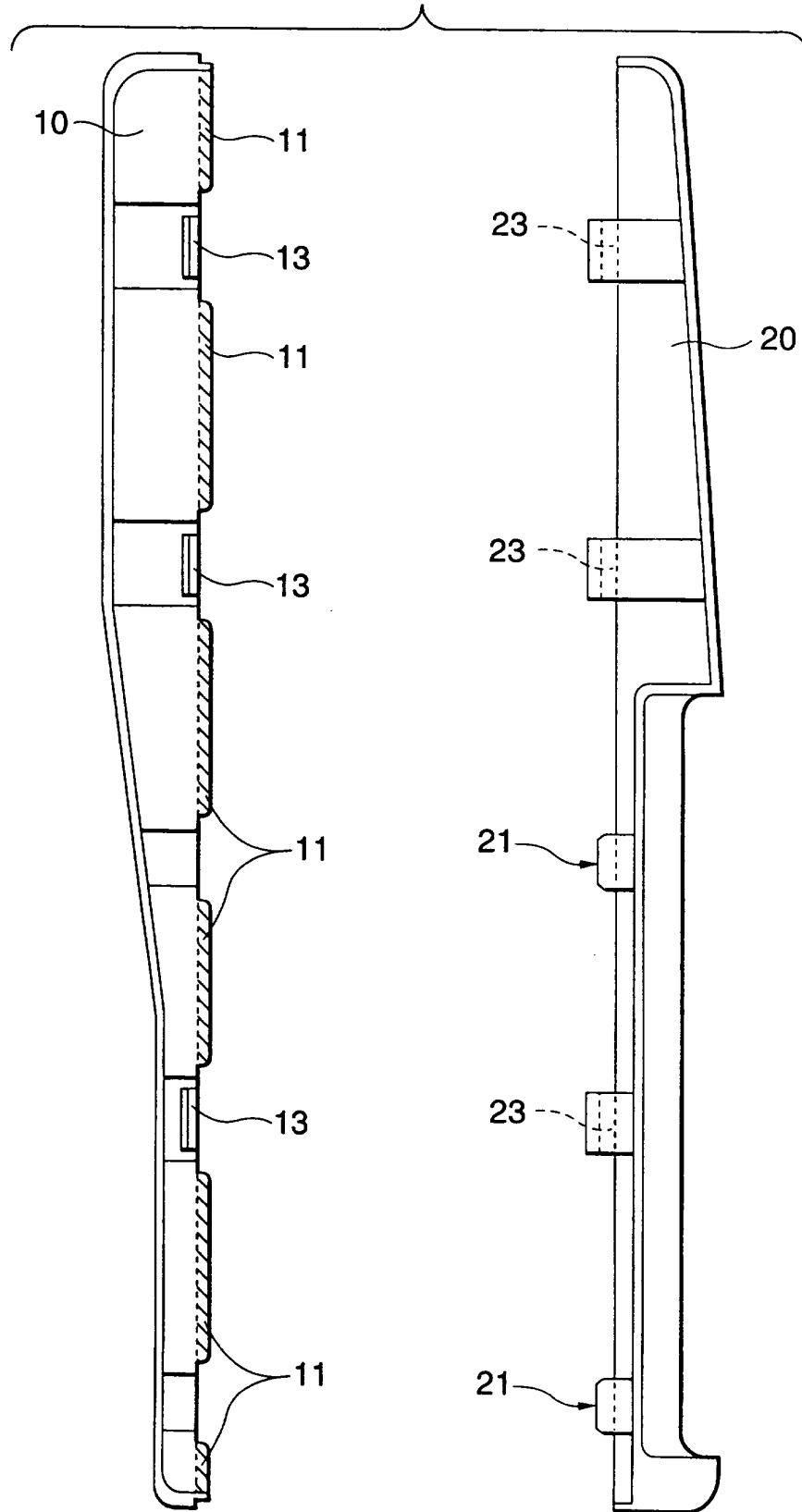


FIG.13

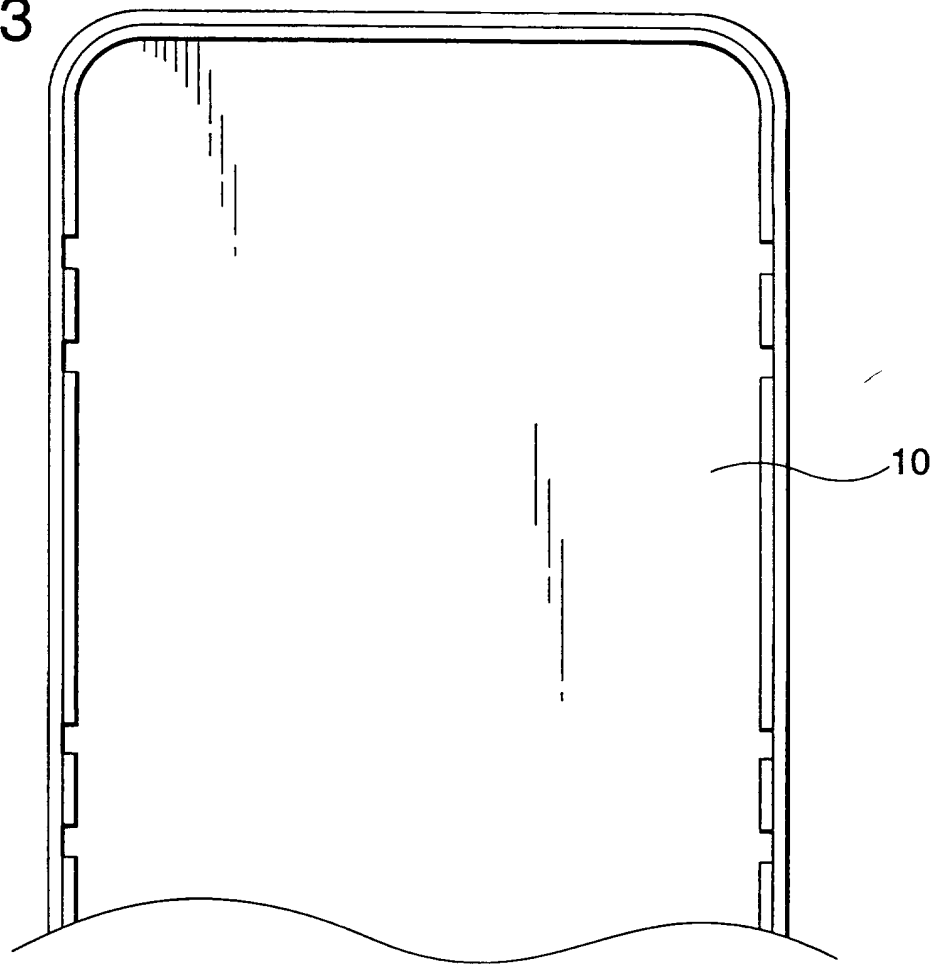


FIG.14

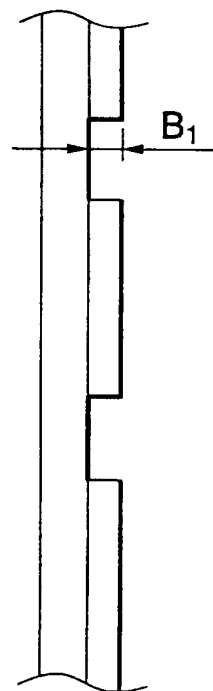


FIG.15

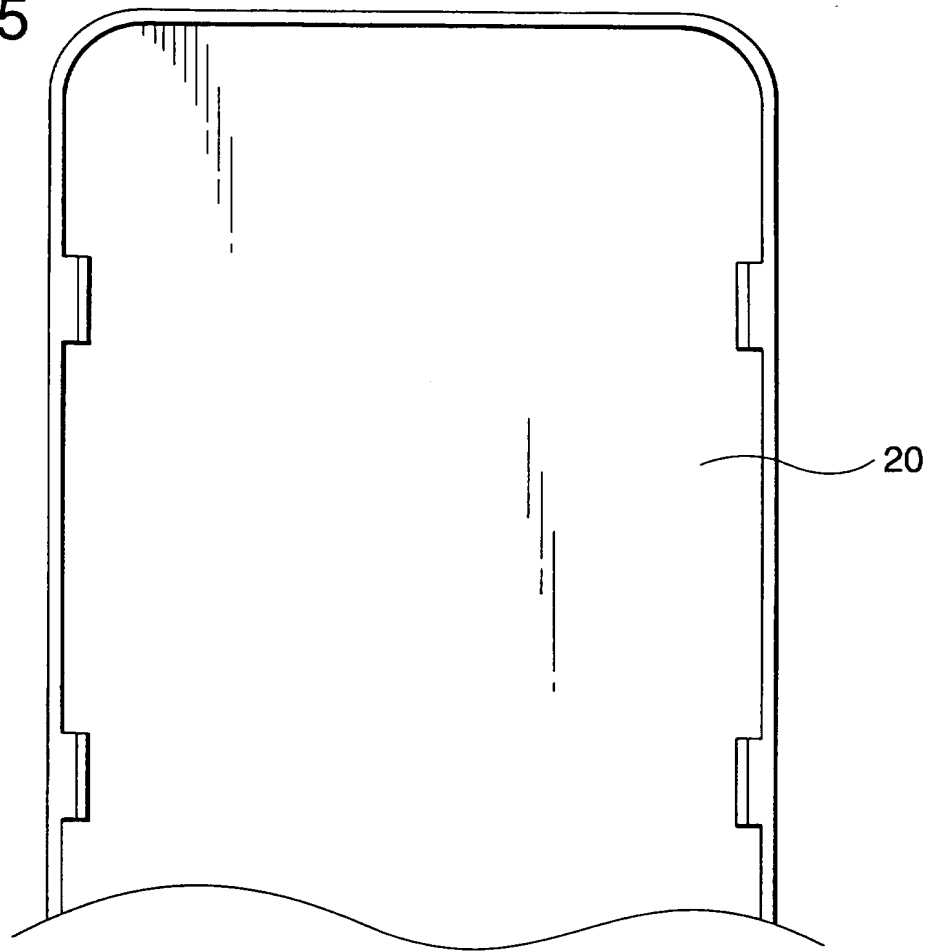


FIG.16

